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DEAN D. SMALL
THE SMALL PATENT LAW GROUP LLP
611 OLIVE STREET, SUITE 1611
ST. LOUIS, MO 63101

EXAMINER	
PRENDERGAST, ROBERTA D	
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2628	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/719,773	STEEN, ERIK N.	
	Examiner	**Art Unit**	
	ROBERTA PRENDERGAST	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12 and 15-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12 and 15-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatfield et al. U.S. patent No. 5779641 in view of Hossack et al. U.S. Patent No. 6116244 and Burr U.S. Patent No. 6169549.

Referring to claim 1, Hatfield et al. teaches graphics processing circuitry comprising a graphics processing unit (Fig. 1(element 20)), a system interface coupled to the graphics processing unit (Fig. 1(element 8); column 1, lines 52-57), and a graphics memory coupled to the graphics processing unit (Fig. 1 (element 6)), the graphics memory comprising an image data block storing image data entries for at least one ultrasound beam (Figs. 1(elements 14A and 14B) and 6(element 80); column 2, lines 5-11, 16-30, and 39-47, i.e. B-mode image data and colorflow image data are stored in graphics memory 14A and 14B), a vertex data block storing vertex entries that define rendering shapes (Figs. 1(element 18) and 6(element 70, 72, and 78); column 2, lines 39-63, , i.e. coordinate transformation of the colorflow and B-mode data is performed to produce appropriately scaled coordinate display pixel data in x-y graphics memory and the graphics data produces graphics overlays that are understood to be

the rendering shapes defined by the vertex entries and rendered onto the image plane via ray-casting), and rendering plane definitions (Figs. 1(element 24) and 6(element 80); column 2, lines 50-65; column 9, lines 16-45, i.e. it is understood that the image plane graphics memory contains rendering plane definitions that define the shape of the object), where the graphics processing unit accesses the image data entries and vertex entries to render a volume according to the rendering plane definitions with blending parameters for selected image data entries (columns 8-9, lines 52-11; column 9, lines 45-67; column 10, lines 3-19; column 11, lines 47-66; column 12, lines 1-5, i.e. the graphics processing unit accesses the image data entries to retrieve the scaled image plane data and then accesses the vertex entries to supply the region of interest pixels to the convolution filter and then filters the pixels according to the weighting coefficients/blending parameters stored in the look-up table at which time the projection technique is applied until all projected images are stored in cine memory and can then be selected by an operator for display) but does not specifically teach wherein the rendering shapes include a series of triangles that form a triangle strip and that share at least one common vertex and wherein the graphics processing unit renders the volume using alpha blending in accordance with the blending parameters.

Hossack et al. teaches wherein the graphics-processing unit renders the volume using alpha blending in accordance with the blending parameters (columns 4-5, lines 61-19).

Burr teaches wherein the rendering shapes include a series of triangles that form a triangle strip and that share at least one common vertex (Figs. 2-4D and 8; column 1,

lines 7-30; column 2, lines 5-10; column 3, lines 7-12 and 17-25; column 4, lines 31-35, i.e. the triangle fans (cycles) are understood to be triangle strips that share at least one common vertex).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the graphics processing circuitry of Hatfield et al. to include the teachings of Hossack et al. and Burr wherein the graphics processing unit renders the volume using alpha blending in accordance with the blending parameters thereby allowing the viewing of internal objects relative to surrounding objects such that opacity levels are utilized to emphasize areas of clinical interest (Hossack et al: columns 1-2, lines 55-6; column 2, lines 25-25) and wherein the rendering shapes include a series of triangles that form a triangle strip and that share at least one common vertex thereby reducing the number of vertices that must be passed and processed by the graphics subsystem since three vertices must be passed for the first triangle but only one vertex must be passed for each subsequent triangle as opposed to three vertices per triangle such that continuous LODs may be provided without incurring unnecessary and wasteful storage requirements, that effectively manages mesh partitionings to optimize rendering and allowing rendering of mesh discontinuities (Burr: column 2, lines 49-65) and further providing triangle fans of higher quality than the triangle strips used in conventional techniques (Burr: column 3, lines 17-25).

Referring to claim 16, the rationale for claim 1 is incorporated herein, Hatfield et al., as modified above, teaches a medical ultrasound imaging system comprising an

image sensor for obtaining image data from a volume of a region of interest (Fig. 1(elements 2 and 8)), a first memory (Fig. 1(element 14A and 14B); column 2, lines 39-46, i.e. B-mode data and color flow data are first stored in the acoustic line memories), a signal processor coupled to the image sensor and the first memory for receiving the image data and storing the image data in the first memory (Fig. 1(element 8); column 2, lines 5-11 and 24-46, i.e. B-mode data and color flow data are processed by the B-mode processor and the color flow processor and stored in the acoustic line memories), and graphics processing circuitry comprising the elements of claim 1 but does not specifically teach wherein the signal processor initiates rendering of the volume according to a plurality of rendering planes defined by one of a plurality of sets of rendering geometries, each of the sets of rendering geometries defining at least one different rendering plane for one of a different depth and curved surface.

Burr teaches this limitation (Figs. 2-4D and 8; column 1, lines 7-30; column 2, lines 5-10; column 3, lines 7-12 and 17-25; column 4, lines 31-35, i.e. the triangle fans (cycles) are understood to be triangle strips that share at least one common vertex and each of the triangle fans/cycles define different rendering planes at a different level of detail based on the distance from the user thus indicating that the different triangle cycles/fans are defined for the different rendering planes based on depth).

The rationale for combining Hatfield et al. with the teachings of Hossack et al. and Burr as found in the motivation statement of claim 1 is incorporated herein.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hatfield et al. in view of Hossack et al. as applied to claims 1 and 16 above, and further in view of Schoolman U.S. Patent No. 5488952.

Referring to claim 25, the rationale for claims 1 and 16 are incorporated herein, those elements that are similar in scope to elements of claims 1 and 16 are rejected under the same rationale.

Additionally, as per claim 25, Schoolman further teaches blending the rendering planes to form a first volume rendering from a first viewing direction and a second volume rendering from a second viewing direction, the first and second viewing directions defining a stereoscopic volume rendering (Abstract; Figs. 1, 4-11; columns 4-5, lines 65-14; column 5, lines 26-48; columns 5-6, lines 55-10; column 9, lines 35-48; columns 10-11, lines 64-10; column 11, lines 27-44, i.e. polygon lists are generated and sent to the left and right image processors to generate a left and right image for a first and second viewing direction to define the spacing between the observer's eyes in order to define a stereoscopic volume rendering, it is understood that the first viewing direction is the left eye direction and the second viewing direction is the right eye direction).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Hatfield et al. to include the teachings of Hossack et al. and Schoolman to include blending the rendering planes to form a first volume rendering from a first viewing direction and a second volume rendering from a second viewing direction, the first and second viewing directions

defining a stereoscopic volume rendering thereby providing a full three-dimensional effect when using a stereoscopic viewing device such that three-dimensional models of the image data are reconstructed (Schoolman: column 5, lines 3-14; columns 6-7, lines 26-1).

Claims 2-8 and 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatfield et al. in view of Hossack et al. and Burr as applied to claims 1 and 16 above, and further in view of Baldwin et al. U.S. Patent No. 4827413.

Referring to claim 2, the rationale for claim 1 is incorporated herein, Hatfield et al., as modified above, teaches the graphics processing circuitry of claim 1 but does not specifically teach where the graphics memory further comprises the graphics processing unit rendering the volume from back to front.

Baldwin et al. teaches where the graphics memory further comprises the graphics-processing unit rendering the volume from back to front (Abstract; column 1, lines 10-15 and 44-64, i.e. each slice of the volume is rendered in back-to-front order).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the graphics processing circuitry of Hatfield et al. to include the teachings of Hossack et al., Burr and Baldwin et al. wherein the graphics memory further comprises the graphics processing unit rendering the volume from back to front thereby generating two-dimensional images of three-dimensional objects without the need for time consuming surface contour or boundary detection algorithms and since the back-to-front algorithm does not require the checking of a

projected voxel's depth, as do algorithms requiring surface information, the display memory is updated by a relatively quick write operation (Baldwin et al.: column 1, lines 23-43).

Referring to claim 3, the rationale for claim 2 is incorporated herein, Hatfield et al., as modified above, teaches the graphics processing circuitry of claim 2 but does not specifically teach where the blending parameters are stored in the image data block.

Hossack et al. teaches wherein the blending parameters are stored in the image data block (column 2, lines 55-67; column 3, lines 9-32; column 9, lines 14-21, i.e. it is understood that the opacity values are blending parameters and they are stored along with the color values in the image data block).

The rationale for combining Hatfield et al. with the teachings of Hossack et al., Burr and Baldwin et al. as found in the motivation statement of claim 2 is incorporated herein.

Referring to claim 4, the rationale for claim 2 is incorporated herein, Hatfield et al., as modified above, teaches the graphics processing circuitry of claim 2 but does not specifically teach where the blending parameters are stored in a look up table that maps sample values to blending parameters

Hossack et al. teaches where the blending parameters are stored in a look up table that maps sample values to blending parameters (column 2, lines 55-67; columns 3-4, lines 54-19, i.e. the color value and opacity level/blending parameter for each datum/voxel being output from the look-up table indicates the mapping of sample values to blending parameters).

The rationale for combining Hatfield et al. with the teachings of Hossack et al., Burr and Baldwin et al. as found in the motivation statement of claim 2 is incorporated herein.

Referring to claim 5, the rationale for claim 2 is incorporated herein, Hatfield et al., as modified above, teaches the graphics processing circuitry of claim 2 but does not specifically teach where the blending parameters are transparency values.

Hossack et al. teaches where the blending parameters are transparency values (column 4, lines 2-4 and 61-65; column 9, lines 14-21, i.e. the alpha/opacity value is understood to be the transparency value).

The rationale for combining Hatfield et al. with the teachings of Hossack et al., Burr and Baldwin et al. as found in the motivation statement of claim 2 is incorporated herein.

Referring to claim 6, the rationale for claim 2 is incorporated herein, Hatfield et al., as modified above, teaches the graphics processing circuitry of claim 2 where the image data block stores a first dataset of image data entries for a plurality of ultrasound beams of a first type (Fig. 1(element4A)), and a second dataset of image data entries for a plurality of ultrasound beams of a second type (Fig. 1(element 4B)), and wherein at least one of the vertex entries specifies a vertex spatial position, a texture pointer into the first data set, and a texture pointer into the second dataset (column 6, lines 34-45; column 10, lines 58-61; column 11, lines 47-52, i.e. each of the vertex entries contains pixels, represented by a vertex spatial position, includes both intensity data and velocity or power data).

Referring to claim 7, the rationale for claim 6 is incorporated herein, Hatfield et al., as modified above, teaches the graphics processing circuitry of claim 6 where at least one of the first type and second type is colorflow (Fig. 1(element 4B)).

Referring to claim 8, the rationale for claim 6 is incorporated herein, Hatfield et al., as modified above, teaches the graphics processing circuitry of claim 6 where at least one of the first type and second type is B-mode (Fig. 1(element 4A)).

Referring to claim 17, claim 17 recites the limitations of claims 2 and 16 and therefore the rationale for the rejection of claims 2 and 16 are incorporated herein.

Referring to claim 18, claim 18 recites the limitations of claims 3 and 17 and therefore the rationale for the rejection of claims 3 and 17 are incorporated herein.

Referring to claim 19, claim 19 recites the limitations of claims 6 and 16 and therefore the rationale for the rejection of claims 6 and 16 are incorporated herein.

Referring to claim 20, claim 20 recites the limitations of claims 7 and 19 and therefore the rationale for the rejection of claims 7 and 19 are incorporated herein.

Referring to claim 21, claim 21 recites the limitations of claims 8 and 19 and therefore the rationale for the rejection of claims 8 and 19 are incorporated herein.

Claims 27-30 and 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatfield et al. in view of Hossack et al. and Schoolman as applied to claim 25 above, and further in view of Baldwin et al, as applied to claims 2-8 above.

Referring to claim 27, as per claim 27 those elements that are similar in scope to elements of claims 3, 4 and 25 are rejected under the same rationale.

Referring to claim 28, as per claim 28 those elements that are similar in scope to elements of claims 5 and 25 are rejected under the same rationale.

Referring to claim 29, as per claim 29 those elements that are similar in scope to elements of claims 4 and 25 are rejected under the same rationale.

Referring to claims 30-32, as per claims 30-32 those elements that are similar in scope to elements of claims 6 and 25 are rejected under the same rationale.

Referring to claim 33, as per claim 33 those elements that are similar in scope to elements of claims 7 and 25 are rejected under the same rationale.

Referring to claim 34, as per claim 34 those elements that are similar in scope to elements of claims 8 and 25 are rejected under the same rationale.

Claims 9, 10, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatfield et al. in view of Hossack et al., Burr and Baldwin et al. as applied to claim 6 and 19 above, and further in view of Drebin et al. U.S. Patent No. 4835712.

Referring to claim 9, the rationale for claim 6 is incorporated herein, Hatfield et al., as modified above, teaches the graphics processing circuitry of claim 6 but does not specifically teach where at least one of the first and second types is local image gradients.

Drebin et al. teaches where at least one of the first and second types is local image gradients (Abstract, lines 1-12; column 3, lines 34-44; column 13, lines 24-31, i.e. a gradient vector is generated for each voxel by calculating the change in opacity and

the gradient in the X, Y, & Z direction of the 3D voxel array is used to calculate the gradient length and the RGBA values are multiplied by the gradient length).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the graphics processing circuitry of Hatfield et al. to include the teachings of Hossack et al., Burr, Baldwin et al. and Drebin et al. wherein at least one of the first and second types is local image gradients thereby allowing the viewing of internal objects relative to surrounding objects and further allowing the modulation of opacity parameters associated with the image parameters so that some regions of the display image are emphasized such that opacity levels are utilized to emphasize areas of clinical interest (Hossack et al: columns 1-2, lines 55-6; column 2, lines 25-25; column 3, lines 54-61; column 5, lines 1-19), generating two-dimensional images of three-dimensional objects without the need for time consuming surface contour or boundary detection algorithms and since the back-to-front algorithm does not require the checking of a projected voxel's depth, as do algorithms requiring surface information, the display memory is updated by a relatively quick write operation (Baldwin et al.: column 1, lines 23-43) and further providing shading that provides for the rendering of surfaces and boundaries to subvoxel accuracy wherein surfaces remain but solid regions become more transparent such that objects can be viewed which partially obscure other objects and spatial relationships between objects can be accurately rendered (Drebin et al.: column 3, lines 24-44).

Referring to claim 10, the rationale for claim 9 is incorporated herein, Hatfield et al., as modified above, teaches the graphics processing circuitry of claim 9 but does not specifically teach a light source definition stored in the graphics memory.

Drebin et al. teaches a light source definition stored in the graphics memory (Abstract, lines 13-18; column 19, lines 50-61; column 20, lines 11-21, i.e. a light vector L is generated and stored in temporary work space of the graphics/picture memory).

The rationale for combining Hatfield et al. with the teachings of Hossack et al., Burr, Baldwin et al. and Drebin et al. as found in the motivation statement of claim 9 is incorporated herein.

Referring to claim 22, claim 22 recites the limitations of claims 9 and 19 and therefore the rationale for the rejection of claims 9 and 19 are incorporated herein.

Referring to claim 23, claim 23 recites the limitations of claims 10 and 19 and therefore the rationale for the rejection of claims 10 and 19 are incorporated herein.

Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hatfield et al. in view of Hatfield et al. in view of Hossack et al., Schoolman and Baldwin et al. as applied to claim 31 above, and further in view of Drebin et al., as applied to claim 9 above.

Referring to claim 35, as per claim 35 those elements that are similar in scope to elements of claims 9 and 25 are rejected under the same rationale.

Claims 11, 12, 15 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatfield et al. in view of Hossack et al., Burr and Baldwin et al. as applied to claims 1, 16, and 25 above, and further in view of Vining U.S. Patent No. 6083162.

Referring to claim 11, the rationale for claim 1 is incorporated herein, Hatfield et al., as modified above, teaches the graphics processing circuitry of claim 1 where the vertex data block has a first set of vertex entries that define the rendering plane definitions where the graphics processing unit accesses image data entries and the first set of vertex entries to render a volume according to the rendering plane definitions with blending parameters for the selected image data entries but does not specifically teach where the vertex data block has a second set of vertex entries that specifies an anatomical model wherein the graphics processing unit accesses image data entries and the first set of vertex entries to render a volume according to the rendering plane definitions with blending parameters for the selected image data entries and the second set of vertex entries to render the anatomical model.

Vining teaches a second set of vertex entries that specifies an anatomical model (Fig. 2(element 14); column 13, lines 60-66, i.e. the wireframe model is stored in the form of a set of vertices and interconnecting line segments that define the anatomical model) wherein the graphics processing unit accesses image data entries (Fig. 2(element 12); column 9, lines 26-32) and the first set of vertex entries to render a volume according to the rendering plane definitions with blending parameters (column 10, lines 39-50; column 11, lines 1-24; column 14, lines 15-51, i.e. the coronal, sagital,

axial, or transverse planes are rendering plane definitions and the opacity value is the blending parameters) for the selected image data entries and the second set of vertex entries to render the anatomical model (Figs. 2 and 7; column 7, lines 21-56; columns 13-14, lines 60-15, i.e. the isosurface model is first created by using the first set of vertex entries to render an isosurface model according to the rendering plane definitions and the blending parameters and then a wireframe model is applied to the isosurface model to render the anatomical model).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the graphics processing circuitry of Hatfield et al. to include the teachings of Hossack et al., Burr, Baldwin et al. and Vining wherein the graphics processing unit renders the volume using alpha blending in accordance with the blending parameters, wherein the blending parameters are stored in a look up table that maps sample values to blending parameters, thereby allowing the viewing of internal objects relative to surrounding objects and further allowing the modulation of opacity parameters associated with the image parameters so that some regions of the display image are emphasized such that opacity levels are utilized to emphasize areas of clinical interest (Hossack et al: columns 1-2, lines 55-6; column 2, lines 25-25; column 3, lines 54-61; column 5, lines 1-19) and where the vertex data block has a second set of vertex entries that specifies an anatomical model wherein the graphics processing unit accesses image data entries and the first set of vertex entries to render a volume according to the rendering plane definitions with blending parameters for the selected image data entries and the second set of vertex entries to render the

anatomical model thereby providing a rendering step that occurs rapidly and interactively and that gives the user the ability to “fly” through the volume of data (Vining: column 14, lines 52-61).

Referring to claim 12, the rationale for claim 11 is incorporated herein, Hatfield et al., as modified above, teaches the graphics processing circuitry of claim 11, but does not specifically teach where the anatomical model is a pre-generate model of anatomical structure present in the volume to be rendered.

Vining teaches wherein the anatomical model is a pre-generate model of anatomical structure present in the volume to be rendered (Fig. 17; column 6, lines 56-65; column 7, lines 35-39, i.e. the anatomical model is a selected subvolume/target volume of the dataset to be displayed).

The rationale for combining Hatfield et al. with the teachings of Hossack et al., Burr, Baldwin et al. and Vining as found in the motivation statement of claim 11 is incorporated herein.

Referring to claim 15, the rationale for claim 1 is incorporated herein, Hatfield et al., as modified above, teaches the graphics processing circuitry of claim 1 but does not specifically teach where the graphics processing unit accesses the image data entries and vertex entries to render a volume absent an at least one cut away plane.

Vining teaches where the graphics processing unit accesses the image data entries and vertex entries to render a volume absent an at least one cut away plane (column 16, lines 1-51).

The rationale for combining Hatfield et al. with the teachings of Hossack et al., Burr, Baldwin et al. and Vining as found in the motivation statement of claim 11 is incorporated herein.

Referring to claim 24, claim 24 recites the limitations of claims 11 and 16 and therefore the rationale for the rejection of claims 11 and 16 are incorporated herein.

Claims 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatfield et al. in view of Hossack et al., Schoolman et al. and Baldwin et al. as applied to claim 25 above, and further in view of Vining, as applied to claim 11 above.

Referring to claims 36-38, as per claims 36-38 those elements that are similar in scope to elements of claims 11 and 25 are rejected under the same rationale.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hatfield et al. in view of Hossack et al. and Schoolman et al. as applied to claim 25 above, and further in view of Ramanujam U.S. Patent No. 5570460.

Referring to claim 26, the rationale for claim 25 is incorporated herein, Hatfield et al., as modified above, teaches the method of claim 25 where the step of initiating comprises the step of initiating ray-cast volume rendering (Abstract, lines 8-11; column 4, lines 5-10; column 6, lines 3-20) but does not specifically teach where the step of initiating comprises the step of initiating front to back volume rendering using alpha blending.

Ramanujam teaches where the step of initiating comprises the step of initiating front to back volume rendering using alpha blending (column 2, lines 13-21 and 32-54; column 3, lines 30-33; column 5, lines 30-63; column 6, lines 11-26).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hatfield et al. to include the teachings of Hossack et al., Schoolman et al. and Ramanujam wherein the step of initiating comprises the step of initiating front to back volume rendering using alpha blending thereby providing a unique blending function that is ideally suited for front-to-back rendering, wherein pixel color will no longer be updated when the opacity reaches saturation, that is implemented in the graphics processor itself and speeds up the volume rendering process when compared to the ray-casting approach (Ramanujam: column 6, lines 2-10).

Response to Arguments

Applicant's arguments with respect to claims 1 and 16 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments filed 11/21/2007 have been fully considered but they are not persuasive.

Applicant argues, with respect to claim 25, that the left and right stereoscopic components found in Schoolman are generated from different angles, not from different viewing directions as recited in claim 25.

Examiner respectfully submits that Applicant defines a first volume rendering from a first viewing direction and a second volume rendering from a second viewing direction such that the two renderings may be displayed stereoscopically on a display or viewed through stereoscopic or three dimensional viewing glasses such that the second direction is slightly different from the first thus indicating that the first direction and the second direction are left and right eye view directions, see pages 15-16, paragraph [0064] of the specification as originally filed. Thus the left and right stereoscopic components generated in Schoolman are from different viewing directions as claimed in claim 25, see Schoolman figures 4-11; column 5, lines 26-48; and columns 5-6, lines 55-10.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERTA PRENDERGAST whose telephone number is (571)272-7647. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on (571) 272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roberta Prendergast/
Examiner, Art Unit 2628
3/3/2008

/Ulka Chauhan/
Supervisory Patent Examiner, Art Unit 2628